

Science & Technology: Energy and Control: Grade 7 – Heat

Overall Expectations

- demonstrate understanding that heat is a result of molecular motion;
- identify, through experimentation, ways in which heat changes substances, and describe how heat is transferred;
- explain how the characteristics and properties of heat can be used, and identify the effect of some of these applications on products, systems, and living things in the natural and human-made environments.

Specific Expectations

Understanding Basic Concepts

- distinguish between the concept of temperature and the concept of heat (e.g., temperature is a measure of the average kinetic energy of the molecules in a substance; heat is thermal energy that is transferred from one substance to another);
- explain how heat is transmitted by conduction, convection, and radiation in solids, liquids, and gases (e.g., conduction: a pot heating on a stove; convection: a liquid heating in the pot; radiation: the air being warmed by heat from the element);
- compare, in qualitative terms, the heat capacities of common materials (e.g., water and aluminum have greater heat capacities than sand and Pyrex);

Developing Skills of Inquiry, Design, and Communication

- use appropriate vocabulary, including correct science and technology terminology, to communicate ideas, procedures, and results (e.g., state the boiling and freezing points of water, room temperature, and body temperature in degrees Celsius; correctly use the terms *heat conductor* and *heat insulator*);
- compile qualitative and quantitative data gathered through investigation in order to record and present results, using diagrams, flow charts, frequency tables, bar graphs, line graphs, and stem-and-leaf plots produced by hand or with a computer (e.g., plot a graph showing the decrease in temperature of various liquids from identical initial temperatures);

**Ontario Curriculum Expectations
Covered by the Grade 7 Heat Program
At The Children's Museum**

- communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, written notes and descriptions, charts, graphs, drawings, and oral presentations e.g., use a diagram to illustrate convection in a liquid

Relating Science and Technology to the World Outside the School

- describe and explain issues related to heat pollution, including both positive and negative aspects (e.g., industrial processes and generation of electricity cause heat pollution of large bodies of water);
- identify and describe steps that can be taken to conserve energy (e.g., using insulation) and the reasons for doing so (e.g., rising fuel costs);

Relating Science and Technology to the World Outside the School

- identify and describe past and present-day contributions of astronomy to the quality of human life (e.g., development of the calendar; prediction of events such as eclipses and seasons; provision of information about space and time);
- identify the ways in which the development of materials and technology for space exploration has led to the use of new technologies and materials on earth (e.g., micro-electronics, medical imaging, remote sensing).